

# Analysis of Remoteness Effect of Indigenous Coconut (*Cocosnucifera* L.) Commodity on Farmers Profit at Tidal Lowland Area of Jambi Province-Indonesia

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## Abstract

The research objectives were to analyze pressure magnitude condition in forms of: 1) the excess supply of indigenous coconut commodity on farmers profit and 2) remoteness location of indigenous coconut plantation on farmer's profit. The method used in this research was field survey which was conducted from November 2015 to March 2016 at two Districts of Tanjung Jabung Barat and Tanjung Jabung Timur of Jambi Province distributed at several Sub districts. Data was collected by using questionnaires for 100 respondents and was analyzed by using software of SPSS 20. The results showed the following facts: 1) indigenous coconut had characteristics of excess supply and mostly found at isolated plantation sites, 2) each characteristics of indigenous coconut commodity had negative effect on profit received by farmers. Therefore, local government policy is required to manage specific characteristics of indigenous coconut commodity at this area in form of proper policy strategy such as creating the added value of product through processing of coconut derivative product (product diversification) especially at farmers level which located close to plantation sites.

*Key words: Remoteness, indigenous coconut, profit, farmer, tidal lowland*

## Abstrak (Indonesian)

Penelitian ini bertujuan untuk menganalisis besarnya tekanan dari kondisi berupa: 1) kelebihan penawaran (excess supply) komoditi kelapa-dalam terhadap keuntungan petani, dan 2) keterisolan letak kebun kelapa-dalam terhadap keuntungan petani. Metode penelitian adalah survey lapangan yang dilakukan pada bulan November 2015 – Maret 2016 di dua Kabupaten yaitu Kabupaten Tanjung Jabung Barat dan Tanjung Jabung Timur Provinsi Jambi yang tersebar pada beberapa kecamatan. Data direkam dengan kuesioner untuk 100 responden dan dianalisis dengan menggunakan bantuan software SPSS 20. Hasil Penelitian menyimpulkan bahwa: 1) kelapa-dalam memiliki beberapa kondisi dilapangan yaitu: komoditi kelapa-dalam berciri kelebihan penawaran (excess supply), dan lokasi kebun mayoritas terisolir, dan 2) karakter khas komoditi kelapa-dalam tersebut masing-masing memberikan pengaruh yang negatif terhadap keuntungan yang diterima petani. Oleh karena itu, perlu kebijakan pemerintah untuk mengatasi karakter khas dari komoditi kelapa-dalam di wilayah ini berupa strategi kebijakan yang tepat, yaitu menciptakan nilai tambah produk dengan dilakukannya pengembangan usaha pengolahan produk turunan kelapa (diversifikasi produk) terutama di tingkat petani yang berada tidak jauh dari lokasi kebun.

*Kata kunci: Keterisolan, kelapa-dalam, keuntungan, petani, pasang surut*

## 1. Introduction

Indigenous coconut is superior commodity of plantation which occupy the third rank covering area of 117,954 ha besides rubber commodity (662,213 ha) and oil palm commodity (405,949 ha) at Jambi Province. The effort of indigenous coconut plantation currently was in form of community farm enterprise [6] [11].

Development of indigenous coconut commodity has some interesting points to be taken into account [5] [1] [15] [16]. Firstly, production level or supply of indigenous coconut is higher than

demand level from the existed processing industry ( $QS > QD$ ). The excess supply of indigenous coconut production as raw material for processing industry was indicated by its absorption of only 59.36 percent from production magnitude at farm level [16] [13]. Secondly, plantation sites of indigenous coconut are generally isolated. Tanjung Jabung Barat and Tanjung Jabung Timur Districts are geographically located in the vicinity of seashore area consisting of tidal peat land [4] [13]. Plantation sites are generally scattered and far away from market center as facility of product selling coupled with relatively insufficient transportation structures and infrastructures [7] [3] [17] [14] [12] [18].

Based on the above discussion, the writer had formulated the research problem as follows: "If indigenous coconut commodity at the study location is in excess supply condition and geographical position of plantation is isolated, then it is important to determine the pressure magnitude of these characteristics on profit received by indigenous coconut farmers" [8] [9] [10]. Therefore, the research objective was to analyze the pressure magnitude in forms of: 1) the excess supply of indigenous coconut commodity on farmers profit

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and 2) Remoteness location of indigenous coconut plantation on farmer's profit.

## 2. Experimental Section

This research was conducted at two Districts of Tanjung Jabung Barat and Tanjung Jabung Timur. It was done from November 2015 to March 2016. The research method used in this study was survey. The sample numbers from population can be calculated by using Slovin formula as follow:

$$n = \frac{N}{1 + N(e)^2} \text{ and } n_i = \frac{N_i}{N} \times n$$

Where:

n : predetermined sample numbers

N : population numbers at the research site

e : percent of inaccuracy allowance (precision) due to the assigned sampling error. The precision used in this research was 10 percent.

$n_i$  : sample numbers of stratum

$N_i$  : population numbers of stratum

Farmer samples to be used as respondents were determined by using equation of proportional sampling allocation method. Sample numbers of indigenous coconut farmer in this research was 100 Head of Families using Slovin method which distributed at several Sub districts within Tanjung Jabung Barat and Tanjung Jabung Timur Districts. Samples were taken by using stratified random sampling.

Components to be analyzed and their analytical instruments were as follows:

1. Analyzing the pressure magnitude from excess supply condition of indigenous coconut commodity toward farmers profit level. The first step was samples clustering based on surplus area and inadequate area. Subsequently regression analysis was conducted to determine the relationship nature between excess supply condition of indigenous coconut commodity and profit level received by indigenous coconut farmers by using function as follows:

$$Jl = a + b_1Q + b_2D + e \quad (1)$$

Where:

Jl = Farmers profit (Rp/year)

Q = Production of indigenous coconut (kg/year)

D = Market accessibility as dummy variable (score)

D = 1, Farmers with easy accessibility level and without excess supply

D = 0, Farmers with difficult accessibility level (isolated) and excess supply

a = constant

$b_1, b_2$  = magnitude of parameters to be determined.

Table 1. Correlation Analysis and Coefficient of Determination

Model Summary <sup>b</sup>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.984 <sup>a</sup>	0,969	0,968	364,720,876,868

a. Predictors: (Constant), excess supply, coconut production

b. Dependent Variable: profit

With:

$$Jl = TR - TC \quad (2)$$

$$Jl = (Hy.Y) - (FC + VC) \quad (3)$$

Where:

Jl = Farmer's profit (Rp/year)

TR = Total revenue (Rp/year)

Y = Production quantity (kg/year)

Hy = Product price (Rp/kg)

TC = Total cost (Rp/year)

FC = Fixed cost (Rp/year)

VC = Variable cost (Rp/year)

2. Analyzing the pressure magnitude of plantation site remoteness toward farmers profit level. The first step was samples clustering between isolated site and unisolated site in term of their accessibilities. Accessibility in this case is represented by availability of transportation structures and infrastructures into market place. The subsequent step is to calculate farmers profit level at isolated site and unisolated site followed by determination of variance values for farmer profit at isolated site ( $s_1^2$ ) and at unisolated site ( $s_2^2$ ). The third step was to determine the difference between farmers profit at isolated site and unisolated site by using t-test as follows [19] [20][21].

$$t_{\text{calculated}} = \frac{\bar{X}_1 - \bar{X}_2}{S^2 \sqrt{1/n_1 + 1/n_2}} \quad (4)$$

$$S^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 + n_2) - 2} = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 + n_2) - 2} \quad (5)$$

$$S_1^2 = \frac{\sum[(X_1 - \bar{X})^2]}{n_1 - 1} \quad (6)$$

$$S_2^2 = \frac{\sum[(X_2 - \bar{X})^2]}{n_2 - 1} \quad (7)$$

Where:

$X_1$  = Farmers profit at isolated site

$X_2$  = Farmers profit at unisolated site

$n_1$  &  $n_2$  = Numbers of farmer at isolated site and unisolated site

$s_1^2$  = Variance of farmers profit at isolated site

$s_2^2$  = Variance of farmers profit at unisolated site

$s_d$  = Standard deviation

The decision making criteria are as follows:

Reject  $H_0$  if  $t_{\text{calculated}} > t_{\text{table}}$  ( $\alpha : df = n_1 + n_2 - 2$ );  $\alpha = 5\%$

Accept  $H_0$  if  $t_{\text{calculated}} \leq t_{\text{table}}$  ( $\alpha : df = n_1 + n_2 - 2$ );  $\alpha = 5\%$

Criteria:

If  $t_{\text{calculated}} > t_{\text{table}}$ , then  $H_0$  is rejected which mean that there is significant different between farmers profit at isolated site and unisolated site.

If  $t_{\text{calculated}} \leq t_{\text{table}}$ , then  $H_0$  is accepted which mean that there is no significant different between farmers profit at isolated site and unisolated site.

### 3. Results and Discussions

#### 3.1 The Effect of Excess Supply Condition of Indigenous Coconut on Farmers Profit

The effect of excess supply condition of indigenous coconut on farmers profit level was done by using primary data. The regression model developed in this case was multiple linear regressions with farmers profit as dependent variable as well as coconut production and excess supply condition as independent variables.

#### 3.2. Classic Assumption Test

##### Normality Test

Normality analysis based on Kosmogorov-Sumirnov method (software of SPSS 20) requires that normal curve is occurred if Asymp. Sig. value is located above the maximum error limit, i.e. 0.05. Normality test in regression analysis was done for residual variable or interference variable having random stochastic characteristics. The result of normality test showed sig value of 0.108. The value of Sig (0.108) > 0.05 implied that data can be used because residual variable is normally distributed.

##### Multicollinearity Test

The existence of multicollinearity can be detected by using Variance Inflation Factors (VIF). The respective VIF values for production variable and excess supply variable were 1.122 or less than 10 by using software of SPSS 20 which showed that there was no multi collinearity within data.

##### Heteroscedasticity Test

The existence of heteroscedasticity can be detected by using scatter plot diagram. The following results were obtained by using software of SPSS 20.

This scatter plot diagram showed no distinct pattern where points are distributed above and below zero number (0) in Y axis which implied that there is no heteroscedasticity occurrence.

##### Autocorrelation Test

Autocorrelation test was done by using Runs Test. The result of autocorrelation test showed sig value of 0.267 which was higher

Table 2. Overall Hypothesis Test (F-Test)

ANOVA <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	40,052,146,073,579,300,000	2	20,026,073,036,789,600,000	1,505,478	0,000 <sup>b</sup>
1 Residual	1,290,306,784,826,210,000	97	13,302,131,802,332,000		
Total	41,342,452,858,405,500,000	99			

a. Dependent Variable: profit

b. Predictors: (Constant), excess supply, coconut production

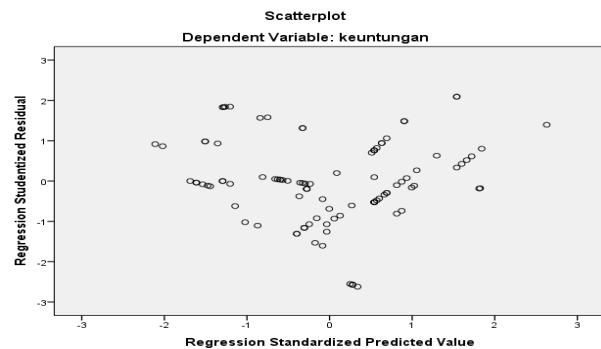


Figure 1. Test of Heteroscedasticity

than 0.05. Therefore, data had random characteristics and no autocorrelation problem.

#### 3.3. Estimation Result of the Effect of Excess Supply Condition of Indigenous Coconut on Farmers Profit

Output from SPSS software showed that correlation coefficient value (R) was 0.984. This value indicates very close relationship between indigenous coconut production and excess supply with farmer's profit. The effect of coconut production, excess supply and inhabitant numbers (IN) on farmers profit was indicated by determination coefficient having value of 0.969. It means that variables of coconut production, excess supply and inhabitant numbers (IN) had effect with magnitude of 96.9% on farmer's profit, whereas the rest effect with magnitude of 3.1% was contributed by other variables. Table 1 showed the results of correlation coefficient and determination coefficient.

Analysis results showed F-calculated value with magnitude of 1,505.478. Because F-calculated value (1,505.478) > F table (3.090), then  $H_0$  is rejected. Thus, it can be concluded that there was simultaneous significant effect of coconut production and excess supply on farmer's profit.

The test results can be summarized as follows:

Variable of coconut production had higher t-value than that of t-table. Because t-calculated value (36.787) > t-table (1.985), then  $H_0$  is rejected. Thus, it can be concluded that there was partially significant effect of coconut production on farmer's profit.

Table 3. Partial Hypothesis Test (t-test)

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	-10,365,147,066	1,452,285,392		-7,137	0,000
1 Coconut production	2,434,088	66,167	0,699	36,787	0,000
Excess supply	20,484,293,281	778,192,216	0,500	26,323	0,000

a. Dependent Variable: profit

Table 4. Results of Normality Test

	Sites condition	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Profit Level	Isolated	,129	44	,063	,941	44	,026
	Unisolated	,111	56	,085	,957	56	,045

a. Lilliefors Significance Correction

Table 5. Derscriptive Statistic Results of Propit Differences Based on Isoleteness Condition of Plantation Site

	Site Condition	N	Mean	Std. Deviation	Std. Error Mean
Profit	Unisolated	56	68.997.994,5714	15.913.905,59010	2.126.585,08584
	Isolated	44	39.082.796,0000	11.167.607,41905	1.683.580,16432

Table 6. results of F-test and t-test

		Levene's Test for Equality of Variances		t-test		
		F	Sig.	t	df	Sig. (2-tailed)
Profit	Equal variances assumed	1,918	0,169	10,584	98	0,000
	Equal variances not assumed			11,029	96,874	0,000

Table 7. Profit of Indigenous Coconut Farm Enterprise Based on Accessibility

Remarks	Farm Enterprise Profit( $\pi$ )	
	Unisolated Area (D=1)	Isolated Area (D=0)
Average (Rp/year)	68.997.995	39.082.796
Average (Rp/ha/year)	23.238.837	13.828.149
Average(Rp/kg/year)	2.856	1.914

*Excess supply* variable had higher t-calculated value than that of t-table. Because t-calculated value (26.323) > t-table (1.985), then  $H_0$  is rejected. Therefore, it can be concluded that there was partially significant effect of excess supply on farmer's profit.

The regression equation to determine the effects of coconut production, excess supply and inhabitant numbers on farmers profit was in form of multiple linear regressions as follows:

$$\pi = a + b_1Q + b_2D + e$$

Where:

$\pi$  = Farmer profit (Rp/year)

Q = Production of indigenous coconut (kg/year)

D = Market accessibility as *dummy variable* (score)

D = 1, Farmers with easy accessibility level and without excess supply

D = 0, Farmers with difficult accessibility level (isolated) and excess supply

a = constant

$b_1, b_2$  = magnitude of parameters to be determined.

The equation of multiple linear regressions as presented below was obtained from calculation of the above table.

$$\pi = -10365147,066 + 2434,088 Q + 20484293,281 D$$

$$\pi (0) = -10365147,066 + 2434,088 (0) + 20484293,281 (0) = -10365147,066$$

$$\pi (1) = -10365147,066 + 2434,088 (0) + 20484293,281 (1) = 10119146,22$$

The value of constant was -10,365,147.066 based on excess supply. It means that if farmers profit variable was not affected by coconut production (zero value), then average magnitude of farmers profit having difficult or isolated accessibility level (code 0) would be -10,365,147.066. On the other hand, average magnitude of farmers profit with easy or unisolated accessibility level (code 1) would be -10,119,146.22. Therefore, it can be concluded that farmers profit with easy or unisolated accessibility level (code 1) was higher than that of difficult or isolated accessibility level (code 0).

Analysis of Farmer Profit Differences of Indigenous Coconut Based on Remoteness Condition of Plantation Site Results of normality test by using Kolmogorov Smirnov method showed that samples were normally distributed with significance level of 0.10.

Table 5 showed that the results of descriptive statistics are related to farmers profit differences of indigenous coconut between isolated site and unisolated site, such as it was mentioned by Sjarkowi *et al.* (2007).

Analysis results showed that farmers profit at unisolated site was Rp 68.997.994,5714/year, whereas farmers profit at isolated site was Rp 39.082.796,0000/year, respectively. The t-test subsequently was done to determine whether or not the above differences were statistically significant. Because the differences of 2 samples to be analyzed were free samples, then Variance Test (F-test) should be done prior to t-test. Results of F test and t-test were presented in Table 6. The results showed that F-calculated value with magnitude of 1.918 was not significant at 0.05 significance level. Therefore, it can be concluded that  $H_0$  was rejected or variances of two populations were different and t-test was done for population having different variances.

Results of t-test with different variance had produced t-calculated value of 11.028 and it was significant at significance

level of 0.05 because t-calculated value (11.028) > t-table (1.984) and sig value (0.000) < 0.05. It can be concluded that there was significant differences of profits between areas having isolated condition and unisolated condition. This analysis results were in accordance to the research finding which was shown by profit value of indigenous coconut farm enterprise based on accessibility of plantation sites such as given in Table 7.

Average value of farm enterprise profit received by farmers at isolated plantation site was Rp 39,082,796.00/year or Rp 13,828,149/ha/year, whereas average value of farm enterprise profit received by farmers at unisolated plantation site was Rp 68,997,995.00/year or Rp 23,238,837/ha/year, respectively. Therefore, average value of farmers profit level at unisolated plantation site was higher than that of isolated plantation site.

#### 4. Conclusion

The conclusion based on results of this study can be stated as follows: 1) indigenous coconut had characteristics of excess supply and mostly found at isolated plantation sites, and 2) each characteristics of indigenous coconut commodity had negative effect on profit received by farmers.

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